CLAIMS

What is claimed is:

1. A beverage dispensing system, comprising:

a housing;

a container defining a cooling chamber;

a bath of cooling fluid disposed within the cooling chamber;

a cooling unit including an evaporator coil extending from the cooling unit into the cooling chamber, whereby the evaporator coil is submerged within the bath of cooling fluid to freeze the cooling fluid thereabout, thereby producing a frozen cooling bank;

sensor units positioned at a desired distance from the evaporator coil to provide output corresponding to the size and shape of the frozen bank; and

a control unit operatively linked with the sensor units and cooling unit, whereby, responsive to the output of the sensor units, the control unit controls the operation of the cooling unit to regulate the growth of the frozen cooling bank.

2. The apparatus according to claim 1, further comprising dispensing valves secured to the housing for forming and dispensing desired beverages.

3. The apparatus according to claim 2, further comprising beverage lines submerged within the bath of cooling fluid and linked with the dispensing valves for communicating beverage fluids.

4. The apparatus according to claim 3, further comprising a carbonator linked to the beverage lines for providing carbonated beverages.

5. The apparatus according to claim 4, wherein the beverage lines comprise:

flavored syrup lines linked from a syrup source to the dispensing valves;

plain water lines linked from a plain water source to the dispensing valves and the

carbonator; and

carbonated water lines linked from the carbonator to the dispensing valves.

6. The apparatus according to claim 1, further comprising an agitator for circulating cooling fluid about the frozen cooling bank.

7. The apparatus according to claim 1, further comprising an ambient temperature sensor operatively linked with the control unit to provide output corresponding to the ambient temperature.

8. The apparatus according to claim 1, further comprising a dispensing valve temperature sensor operatively linked with the control unit to provide output corresponding to the temperature of dispensing beverages.

9. The apparatus according to claim 1, wherein at least two sensor units are positioned at a desired distance from the evaporator coil, whereby the sensor units monitor the overall size and shape of the frozen cooling bank.

10. The apparatus according to claim 1, wherein the sensor unit comprises:

a first control probe immersed in the bath of cooling fluid and located a distance from the evaporator coil representing the minimum desired size of the frozen cooling bank;

a second control probe immersed in the bath of cooling fluid and located at a greater distance from the evaporator coil than the first control probe representing the maximum desired size of the frozen cooling bank;

a reference control probe immersed in the bath of cooling fluid, whereby the reference control probe monitors the cooling fluid.

11. The apparatus according to claim 10, wherein the sensor unit further comprises a third control probe immersed in the bath of cooling fluid and located at a distance from the evaporator

coil in between the first control probe and the second control probe representing an intermediate desired size of the frozen cooling bank.

12. The apparatus according to claim 10, wherein the output from the sensor units comprises:

a first signal indicating the voltage potential between the first control probe and the reference control probe to determine if the first control probe is covered by cooling fluid or the frozen bank; and

a second signal indicating the voltage potential between the second control probe and the reference control probe to determine if the second control probe is covered by cooling fluid or the frozen bank.

13. The apparatus according to claim 1, wherein the control unit comprises a microprocessor.

14. The apparatus according to claim 1, wherein the bath of cooling fluid comprises water.

15. A method for regulating growth of a frozen cooling bank in a beverage dispensing system comprising:

monitoring sensor units to determine the size and shape of the frozen cooling bank;

starting a cooling unit if the sensor units indicate the frozen cooling bank does not cover a selected freeze point on all the sensor units; and

stopping the cooling unit if the sensor units indicate the frozen cooling bank covers the selected freeze point on all the sensor units.

16. The method according to claim 15, further comprising stopping the cooling unit if the sensor units indicate the frozen cooling bank has problematic overgrowth at any one of the sensor units.

17. The method according to claim 15, further comprising determining the status of all variables considered when selecting a freeze point.

18. The method according to claim 17, further comprising selecting the freeze point based upon

the conditions of the variables.

19. The method according to claim 17, wherein the variables considered are selected from the group consisting of freeze cycle, cycle times, ambient temperature, dispensing valve temperature, humidity, water source temperature, flavored syrup source temperature, energy use, time of day, and carbon dioxide source temperature.

20. The method according to claim 15, wherein the variable considered is a freeze cycle.

21. The method according to claim 20, wherein determining the variable status of "first-freeze" results in a selection of a freeze point to produce a smaller frozen cooling bank.

22. The method according to claim 20, wherein determining the variable status of "not a first-freeze" results in a selection of a freeze point to produce a larger frozen cooling bank.

23. The method according to claim 15, wherein the variable considered is ambient temperature.

24. The method according to claim 23, wherein determining the variable status of "low ambient temperature" results in a selection of a freeze point to produce a smaller frozen cooling bank.

25. The method according to claim 23, wherein determining the variable status of "high ambient temperature" results in a selection of a freeze point to produce a larger frozen cooling bank.

26. The method according to claim 15, wherein the variable considered is dispensing valve temperature.

27. The method according to claim 26, wherein determining the variable status of "dispensing valve temperature loading" results in a selection of a freeze point to produce a larger frozen cooling bank.